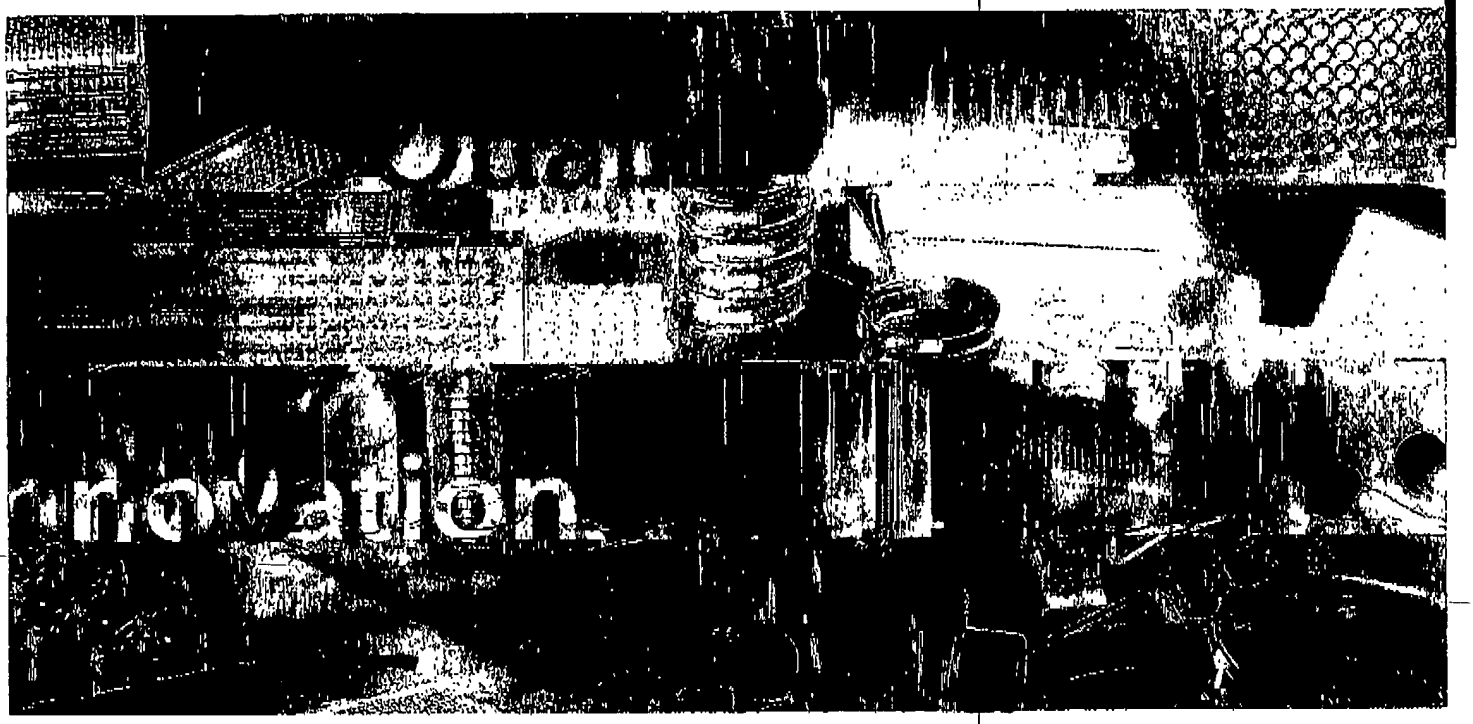

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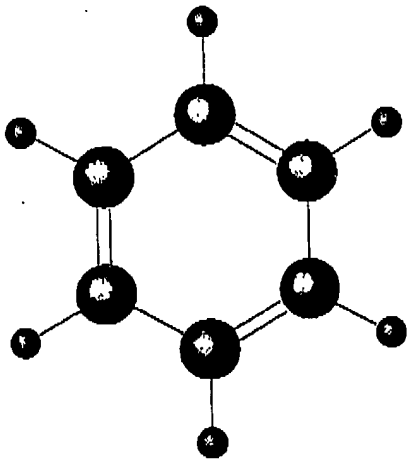
NUNC Labware
Chemical Resistance Chart

Interpretati n of Chemical Resistance

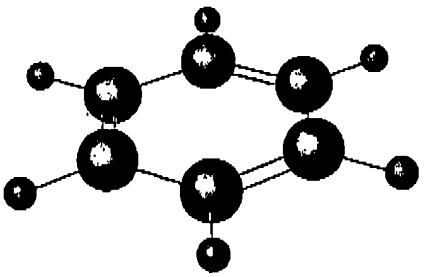
The Chemical Resistance Chart that follows is a general guide only. Because so many factors can affect the chemical resistance of a given product, *you should test under your own conditions.*

Effects of Chemicals on Plastics

Chemicals can affect the strength, flexibility, surface appearance, colour, dimensions or weight of plastics. The basic modes of interaction which cause these changes are: (1) chemical attack on the polymer chain, with resultant reduction in physical properties, including oxidation; reaction of functional groups in or on the chain; and depolymerization; (2) physical change, including absorption of solvents, resulting in softening and swelling of the plastic; permeation of solvent through the plastic; dissolution in a solvent; and (3) stress-cracking from the interaction of a "stress-cracking agent" with molded-in or external stresses. Also see "Chemical Resistance Classification."



Mixing and/or dilution of certain chemicals in NUNC labware can be potentially dangerous.
The reactive combination of different chemicals or compounds of two or more classes may cause an undesirable chemical effect or result in an increased temperature which can affect chemical resistance (as temperature increases, resistance to attack decreases). Other factors affecting chemical resistance include pressure and internal or external stresses (e.g. centrifugation), length of exposure, and concentration of the chemical.



Environmental Stress-Cracking

Environmental stress-cracking is the failure of a plastic material in the presence of certain types of chemicals. This failure is not a result of chemical attack. Simultaneous presence of three factors causes stress-cracking: tensile stress, a stress-cracking agent and the inherent susceptability of the plastic to stress-cracking.

Common stress-cracking agents are detergents, surface active chemicals, lubricants, oils, ultra-pure water and plating additives such as brighteners and wetting agents. Relatively small concentrations of stress-cracking agent may be sufficient to cause cracking.

Mixing and/or dilution of certain chemicals may result in reactions which produce heat which can cause product failure.
Pre-test your specific usage and always follow correct lab safety procedures.

Caution

Do not store strong oxidizing agents in plastic labware except that made of TEFLON FEP or PFA. Prolonged exposure causes the material to become brittle.

We have included a number of resins which are not used in Nunc products, as we feel that customers may find the information useful.

Resin Codes

ACL	Acetal (polyoxymethylene)
ECTFE	Halar ECTFE (ethylene-chlorotrifluoroethylene copolymer)
ETFE	Tefzel ETFE (ethylene-tetrafluoroethylene)
FEP	TEFLON FEP (fluorinated ethylene propylene)
HDPE	High-density polyethylene
LDPE	Low-density polyethylene
NYL	Nylon (polyamide)
PC	Polycarbonate
PETG	(Polyethylene terephthalate copolymer)
PFA	TEFLON PFA (perfluoroalkoxy)
PMMA	Polymethyl methacrylate (acrylic)
PP	Polypropylene
PPCO*	Polypropylene copolymer
PS	Polystyrene
PSF	Polysulfone
PUR	Polyurethane
PVDF	Polyvinylidene fluoride
TFE	TEFLON TFE (tetrafluoroethylene)
TMX	Thermanox
TPE	Thermoplastic elastomer
PMX	Permanox
XLPE	Cross-linked high-density polyethylene

**PPCO has replaced polyallomer (PA) in all products.*

NUNC Brand Products

ADDITIONAL INFORMATION

Physical Properties of Nunc Products

	Max. Use Temp (°C)	Transparency	Microwave-ability[1]	Sterilization[3] Auto-claving	Gas	Dry Heat	Radi-ation	Disin-fectants	Specific Gravity	Flexi-bility	Permeability Coefficient Units: $\frac{ml \cdot mm}{sec \cdot cm^2 \cdot cmHg} \times 10^{-10}$ N_2	O_2	Co_2
ACL	121	Opaque	Marginal[2]	Yes[4]	Yes	No	No	Yes	1.43	rigid	0.2	0.4	1.6
ETFE/ECTFE	150	Transluc	Yes	Yes	Yes	Yes	No	Yes	1.70	rigid	—	—	—
FEP	205	Transluc	Marginal[2]	Yes	Yes	Yes	No	Yes	2.15	excel	20	60	135
HDPE	120	Transluc	No	No	Yes	No	Yes	Yes	0.95	rigid	3	10	45
LDPE	80	Transluc	Yes	No	Yes	No	Yes	Yes	0.92	excel	20	60	280
NYL	90	Transluc	No	No	Yes	No	Yes	Yes	1.13	rigid	0.3	1.0	1.8
PC	135	Clear	Marginal[2]	Yes[4]	Yes	No	Yes	Yes	1.20	rigid	3	20	85
PETG	70	Clear	Yes	No	Yes	No	Yes	Yes	1.27	mod	0.8	1.1	4.5
PFA	250	Transluc	Yes	Yes	Yes	Yes	No	Yes	2.15	excel	—	—	—
PMMA	50	Clear	—	No	Yes	No	Yes	Some	1.20	rigid	—	—	—
PP	135	Transluc	Yes	Yes	Yes	No	No	Yes	0.90	rigid	4	25	90
PPCO	121	Transluc	Marginal[2]	Yes	Yes	No	No	Yes	0.90	mod	6	30	100
PS	90	Clear	No	No	Yes	No	Yes	Some	1.05	rigid	3	15	75
PSF	165	Clear	Yes	Yes	Yes	Yes	Yes	Yes	1.24	rigid	3	15	60
PUR	82	Clear	No	No	Yes	No	Yes	Yes	1.20	excel	—	—	—
PVDF	110	Transluc	—	No	Yes	No	No	Yes	1.75	rigid	—	—	—
TFE	121	Opaque	—	Yes	Yes	No	—	Some	1.20	excel	—	—	—
TPE	260	Opaque	—	Yes	Yes	No	—	Some	1.20	excel	—	—	—
TPX	175	Clear	Yes	Yes	Yes	Yes	No	Yes	0.83	rigid	65	270	—
XLPE	100	Transluc	No	No	Yes	No	Yes	Yes	0.93	rigid	—	—	—
TMX	150												
PMX	180												

[1] Ratings are based on 5-minute tests at 100% power (600 watts) of exposed, empty labware. CAUTION: Do not exceed Max. Use Temp., above, or expose labware to chemicals which heating may cause to attack the plastic or be rapidly absorbed.

[2] Plastic will absorb heat.

[3] Sterilization:
Autoclaving (121°C, 15 psi for 20 minutes) - Clean and rinse item with distilled water before autoclaving. Certain chemicals which have no appreciable effect on resins at room temperature may cause deterioration at autoclaving temperatures unless removed with distilled water beforehand.
(Always completely disengage threads before autoclaving).
Gas - Ethylene oxide formaldehyde.
Dry head (160%°C, 120 minutes)
Disinfectants - Benzalkonium chloride, formalin, ethanol, etc. Radiation - gamma irradiation at 2.5 (Mrad) with unstabilized plastc.

[4] Sterilizing reduces mechanical strength. Do not use PC vessels for vacuum applications if they have been autoclaved.

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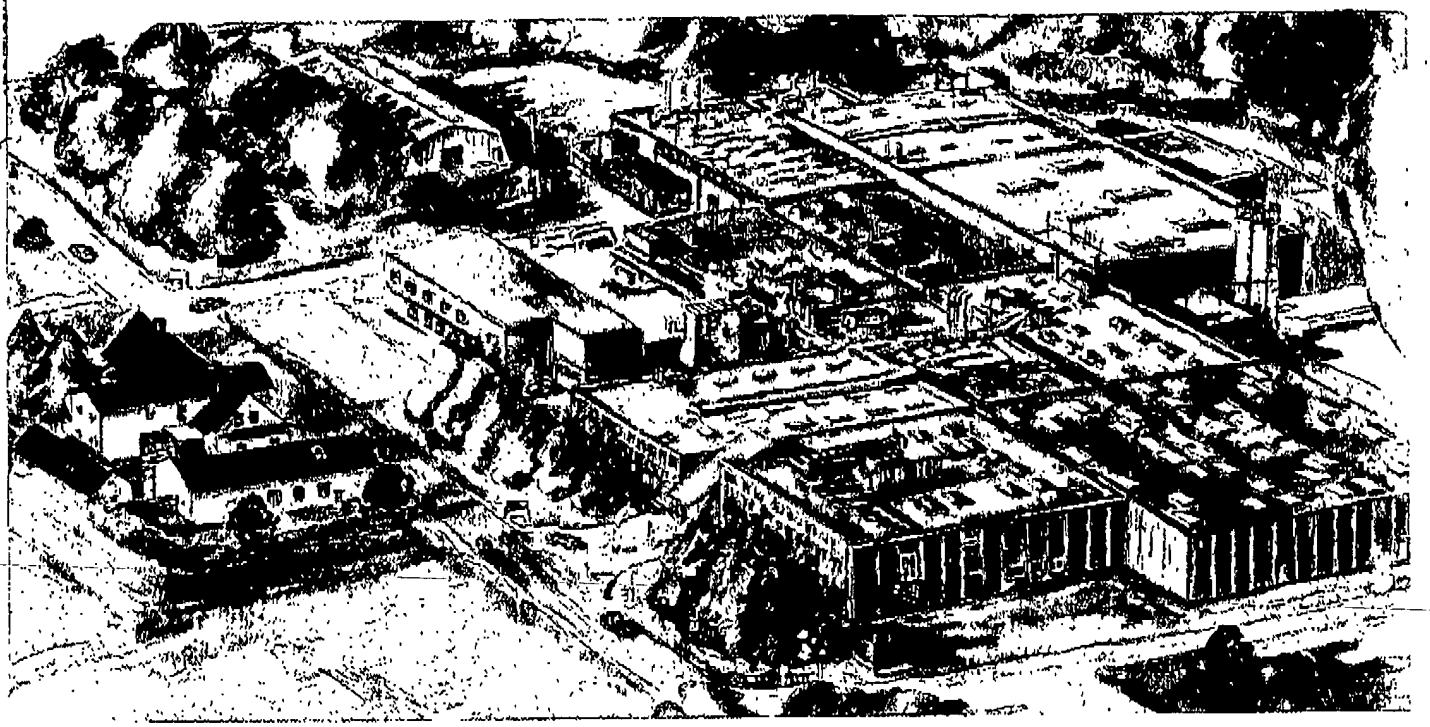

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